

SKIN CONTACTING ARTICLE



Technical Field

The present invention relates to a skin contacting
5 article which contacts with skin.

Background Art

Sanitary articles such as disposable diapers and
sanitary napkins which are applied to skin have, for
10 instance, an absorbing body for retaining fluid, surface
material laminated onto one side of the absorbing body to
be in direct contact with the skin and an impervious
sheet laminated onto the other side of the absorbing body
for preventing the fluid from leaking out of the
15 absorbing body.

A synthetic fiber, non-woven fabric and the like are
widely used as a base of the surface member of the
sanitary article. In recent years, characteristics such
as permeability for immediately conducting excretions to
20 the absorbing body, cleanliness and toughness against
human movement have been desired for the surface
material. Non-woven fabric composed of polypropylene,
polyester, polyethylene and the like is used as a
material satisfying the above demand.

25 Similarly to the sanitary articles, tissue paper,
wet tissue as well as make-up tools for putting on make-
up, specifically, puffs such as a disposable puff and a
powder puff, a make-up brush, sponge etc. are used as the
skin contacting article in contact with the skin.

30 Since the skin contacting articles are used in
direct contact with or for rubbing the skin, a product
having a superior touch (texture) has been conventionally
desired.

Especially, material such as polypropylene, polyethylene and polyester have a bad touch (texture) and, furthermore, causes stuffiness on account of the lack of moisture inhalation, which results in an unpleasant feeling when they are applied to the human body for a long time.

The object of the present invention is to provide a skin contacting article having good touch and moisture inhalation.

10

Disclosure of the Invention

The present invention is directed to a skin contacting article used in contact with skin. The skin contacting article is characterized in having natural organic impalpable powder adhered at least on a side in direct contact with the skin.

The skin contacting article includes tissue paper, wet tissue, a mask and gauze etc. in addition to the below-described sanitary articles and make-up tools.

The natural organic material is, for instance, silk, collagen, cellulose, chitin, chitosan, wool, hemp, cotton, sponge powder, whey and the like. Any one of the natural organic materials or a combination thereof can be selectably used.

The natural organic impalpable powder can be obtained by, for instance, mechanically pulverizing the natural organic material to make an impalpable powder.

The natural organic impalpable powder can be adhered by dispersing the natural organic impalpable powder into an aqueous resin such as an aqueous macromolecule and resin emulsion, an organic solvent such as an alcohol and a solvent such as water and by coating them. Incidentally, the aqueous resin or the solvent may be used alone or in combination.

The base to which the natural organic impalpable powder is adhered, i.e. the base composing the side of the skin contacting article in direct contact with the skin, may be, for example, a fiber such as a synthetic
5 fiber and a natural fiber, a fabric base such as a non-woven fabric, textiles and knits using the fibers, and synthetic resin films, etc.

The synthetic resin may be, for instance, polypropylene, polyester, polyethylene and the like. The
10 natural fiber may be, for instance, silk, cotton and the like.

The synthetic resin film may be, for instance, polyethylene film, polypropylene film, polyester film and the like.

15 Hydrophilic treatment, water repellant treatment, softening treatment, embossing, perforating may be applied to the base.

When the skin contacting article is a sanitary article applied to the skin and has a surface material in
20 direct contact with the skin and, as necessary, an absorbing body covered with the surface material, the surface material preferably includes a base having the natural organic impalpable powder adhered thereto.

The sanitary article refers to articles applied to
25 the skin for a predetermined time, which includes, for instance, disposable diapers, diaper liners, sanitary napkins and the like. Many of them have the absorbing body covered with the surface material.

The skin contacting article may also be a make-up
30 tool used for applying make-up.

The make-up tool includes, for instance, puffs, sponges, make-up brushes, face-masks and the like. The puff includes disposable puffs such as silk puffs, cotton

puffs and rayon puffs in addition to various make-up puffs for putting on make-up.

The natural organic impalpable powder preferably has an average particle size of less than 30 μm .

5 When the average particle size exceeds 30 μm , the natural organic impalpable powder can be hard to adhere to the base and is likely to feel rough.

10 In order to enhance the adhesion to the base, the natural organic impalpable powder preferably has an average particle size of less than 10 μm .

The lower limit of the natural organic impalpable powder is preferably more than 0.1 μm , more preferably more than 1 μm .

15 When the average particle size is less than 1 μm , the powder can be difficult to handle. Furthermore, lots of work is necessary for pulverizing the natural organic material, thereby increasing the production cost.

20 The natural organic impalpable powder is preferably adhered by being processed by a treatment including the natural organic impalpable powder. The treatment preferably consists of the natural organic impalpable powder and at least one dispersion medium selected from the group consisting of water, an organic solvent, a resin emulsion and a resin aqueous solution.

25 Since the natural organic is dispersed in the treatment, the natural organic impalpable powder can be uniformly adhered by the processing using the treatment.

30 The resin emulsion may be a synthetic resin emulsion such as a silicone type, polyurethane type, polyacryl type, fluorine type, polyvinyl alcohol type and carboxymethyl cellulose type, or, alternatively, a natural resin emulsion.

The resin aqueous solution may be, for instance, a synthetic resin aqueous solution including a synthetic

water-soluble macromolecule such as a polyvinyl alcohol type and a carboxymethyl cellulose type. Alternatively, a natural resin aqueous solution including a natural resin type collagen, gelatin, potassium alginate, natural gums and the like may also be used.

Surface active agents may be added to the treatment as necessary to improve the dispersion of the natural organic impalpable powder. The surface active agent may be, for instance, an ionic surface active agent of an anion and a cation, a non-ionic surface active agent such as a polyethylene oxide derivative and a sucrose fatty ester.

Thickening agents may be added in the treatment to prevent sedimentation of the natural organic impalpable powder. The thickening agent may be, for instance, a cellulose derivative such as methyl cellulose and hydroxyethyl cellulose, and a natural macromolecule thickening agent such as various types of gums, pectins, soda alginate, dextrin, agar and gelatin.

The processing with the treatment may be conducted by coating the treatment by the gravure coating method, spray method, padding method (impregnation, dipping) and the like and by drying thereafter.

Incidentally, additional processing such as embossing may be conducted after coating and drying the treatment.

The content ratio of the natural organic impalpable powder in the treatment is preferably 0.5 to 50 wt.%.

When the content ratio of the natural organic impalpable powder is less than 0.5 wt.%, good touch and sufficient moisture inhalation sometimes may not be obtained. When the content ratio exceeds 50 wt.%, the treatment is likely to get too thick to be uniform, in other words, cause agglomeration of the powder.

When the dispersion medium is either one of the resin emulsion or the resin aqueous solution, the solid resin content in the treatment is preferably 0.5 to 20 wt.%.

5 Since the resin works as a binder for fixing the natural organic impalpable powder to the base, the natural organic impalpable powder can be firmly adhered to the base through the resin.

10 When the solid resin content is below 0.5 wt.%, sufficient adhesion of the natural organic impalpable powder to the base by the resin may not be obtained. When the solid resin content exceeds 20 wt.%, good touch and moisture inhalation by the natural organic impalpable powder may not be obtained.

15 According to another aspect of the present invention, the present invention is directed to skin contacting articles used in contact with skin, including natural organic impalpable powder adhered at least on a side in direct contact with the skin by processing using
20 a treatment. The skin contacting article is characterized in that the treatment includes the natural organic impalpable powder having an average particle size of less than 30 μm and either one of a resin emulsion or a resin aqueous solution for dispersing the natural
25 organic impalpable powder, the content ratio of the natural organic impalpable powder in the treatment is 0.5 to 50 wt.% and the solid resin content in the treatment is 0.5 to 20 wt.%.

30 The skin contacting article may preferably be a sanitary article applied to the skin and the skin contacting article preferably has a surface material in direct contact with the skin, the surface material including a base having the natural organic impalpable powder adhered thereto.

The skin contacting article may also preferably be a make-up tool used for applying make-up.

Brief Description of Drawings

5 Fig. 1 is a cross-section showing a first embodiment of the present invention; and

 Fig. 2 is a cross-section showing a second embodiment of the present invention.

10 Best mode for Carrying out the Invention

 Preferred embodiments of the present invention will be described below with reference to the attached drawings.

First Embodiment

15 Fig. 1 shows sanitary article 1 as a skin contacting article according to the first embodiment.

 The sanitary article 1 is, for example, a disposable diaper which is used by being applied to the skin. The sanitary article 1 has a surface material 11 in direct
20 contact with the skin, an absorbing body 12 for absorbing and retaining fluid and an impervious sheet 13 for preventing the fluid from leaking.

 The absorbing body 12 is covered with the surface member 11 on a side thereof facing the skin and absorbs
25 the fluid through the surface member 11.

 The surface member 11 has a base adhered with natural organic impalpable powders, which is obtained by processing the base with a treatment including the natural organic impalpable powders.

30 The treatment can be obtained by: adding the natural organic impalpable powders having average particle size of less than 30 μm to an at least one dispersion medium selected from water, an organic solvent, a resin emulsion and a resin aqueous solution so

that the content of the natural organic impalpable powder is 0.5 to 50 wt.%; stirring; and dispersing the natural organic impalpable powders. When the resin emulsion or the resin aqueous solution is used as the dispersion
5 medium, the treatment is conditioned so that the solid resin content is 0.5 to 20 wt.%.
10

The treatment is coated to and dried on the base of surface material 11 for sanitary articles according to the present embodiment so that the natural organic
10 impalpable powder is adhered thereto.

Second Embodiment

Fig. 2 shows a disposable cotton puff 2 as a skin contacting article according to a second embodiment.

The cotton puff 2 is a make-up tool used for
15 make-up. The cotton puff 2 has an intermediate cotton layer 21 and a surface member 22 covering the intermediate cotton layer 21. The surface member 22 directly touches the skin.

The surface member 22 is produced by adhering the
20 natural organic impalpable powder to the base made of cotton in the same manner as in the first embodiment. In other words, the surface member 22 of the present embodiment can be obtained by processing the base using the same treatment as the first embodiment.

25 Incidentally, skin contacting articles having the surface member, i.e. the sanitary goods 1 and the cotton puff 2, are described in the aforesaid embodiments. However, the arrangement of the skin contacting article to which the present invention is applied is not
30 restricted to a surface member covering the area to which the skin touches.

In other words, the present invention may be applied to, for instance, a make-up brush as a make-up tool. In this case, the natural organic material may be adhered by

conducting the processing by the aforesaid treatment to brush-hair as the skin-contacting part.

When the present invention is applied to a face-mask as a make-up tool, a face-mask having a superior touch
5 can be obtained by adhering the natural organic material to at least one side of a base composed of a non-woven fabric etc. touching the skin by conducting the processing of the aforesaid treatment.

The natural organic material may be adhered by
10 conducting the aforesaid processing to the non-woven fabric, synthetic resin film structuring the surface member of the sanitary napkin as the sanitary article.

Further, the tissue paper and the wet tissue as a skin contacting article can be made by adhering the
15 natural organic material to the base of a fiber sheet such as paper.

Experiment 1

In the first embodiment, a synthetic resin aqueous solution including polyvinyl alcohol, POVAL PVA-117
20 (trade name) manufactured by KURARAY Co., Ltd., dissolved in water was used as the dispersion medium and silk powder having an average particle size of 5 μm was used as the natural organic impalpable powder. The silk powder was mixed in the synthetic resin aqueous solution
25 to be sufficiently dispersed, thereby obtaining the treatment of the present experiment.

The content ratio of the respective components in the treatment is 10 wt.% of the silk powder, 85 wt.% of water and 5 wt.% of polyvinyl alcohol.

30 Polypropylene non-woven fabric was used as the base. The treatment was coated on the polypropylene non-woven fabric by a gravure processing machine so that treatment was coated by 5 g/m^2 in Mezuke (Japanese weight unit showing weight per unit area). Subsequently, the

polypropylene non-woven fabric was dried by a hot air drier at 80°C for one minute to obtain the surface material of the present experiment.

Experiment 2

5 The natural organic impalpable powder of experiment 1 was changed to collagen powder (average particle size of 4 μ m). The treatment was made in the same manner as experiment 1 and the surface material for the sanitary article of the present experiment was obtained using the
10 treatment.

Experiment 3

 The natural organic impalpable powder of experiment 1 was changed to cellulose powder (average particle size of 6 μ m). The treatment was made in the same manner as
15 experiment 1 and the surface material for the sanitary article of the present experiment was obtained using the treatment.

Experiment 4

 The natural organic impalpable powder of experiment
20 1 was changed to chitin powder (average particle size of 5 μ m). The treatment was made in the same manner as experiment 1 and the surface material for the sanitary article of the present experiment was obtained using the treatment.

25 Experiment 5

 The natural organic impalpable powder of experiment 1 was changed to chitosan powder (average particle size of 5 μ m). The treatment was made in the same manner as experiment 1 and the surface material for the sanitary
30 article of the present experiment was obtained using the treatment.

Experiment 6

 A synthetic resin emulsion including CL COAT 5400, (trade name) manufactured by KYOEISHA CHEMICAL Co. Ltd.,

dissolved in water was used as the dispersion medium of experiment 1. The treatment was made in the same manner as in experiment 1 to obtain the surface member for sanitary articles.

5 The content ratio of respective component in the treatment was 10 wt.% of silk powder, 60 wt.% of water and 30 wt.% of CL COAT 5400 (trade name). Since the solid resin content of the CL COAT 5400 was approximately 20 wt.%, the solid resin content in the treatment was
10 approximately 6%.

Experiment 7

 The natural organic impalpable powder of experiment 6 was changed to wool powder (average particle size of 5 μ m). The treatment was made in the same manner as
15 experiment 6 and the surface material for the sanitary article of the present experiment was obtained using the treatment.

Experiment 8

 The natural organic impalpable powder of experiment 6 was changed to hemp powder (average particle size of 5 μ m). The treatment was made in the same manner as
20 experiment 6 and the surface material for the skin sanitary article of the present experiment was obtained using the treatment.

25 Experiment 9

 The natural organic impalpable powder of experiment 6 was changed to cotton powder (average particle size of 4 μ m). The treatment was made in the same manner as
30 experiment 6 and the surface material for the sanitary article of the present experiment was obtained using the treatment.

Experiment 10

 The dispersion medium of experiment 1 was changed to water. Polyethylene glycol ether as a surface active

agent was added to the water to produce the treatment in the same manner as in experiment 1. The surface material for the sanitary article of the present experiment was obtained using the treatment.

- 5 The content ratio of the respective components in the treatment was 10 wt.% of silk powder, 89.5 wt.% of water and 0.5 wt.% of polyethylene glycol ether.

Comparison 1

- 10 The natural organic impalpable powder of experiment 1 was changed to collagen powder (average particle size 35 μ m). The treatment was made in the same manner as in experiment 1. The surface material for the sanitary article of the present comparison was obtained using the treatment.

15 Comparison 2

- 20 The content ratio of the respective components of the treatment of experiment 1 was set as 0.1 wt.% of silk powder, 99.4 wt.% of water and 0.5 wt.% of polyvinyl alcohol. The treatment was made in the same manner as in experiment 1. The surface material for the sanitary article of the present comparison was obtained using the treatment.

Comparison 3

- 25 The content ratio of respective components of the treatment of experiment 1 was set as 55 wt.% of silk powder, 44.5 wt.% of water and 0.5 wt.% of polyvinyl alcohol. The treatment was made in the same manner as in experiment 1. The surface material for the sanitary article of the present comparison was obtained using the treatment.

Comparison 4

30 The polyethylene non-woven fabric of experiment 1 was used unprocessed without conducting processing by the treatment according to experiment 1.

The moisture inhalation and touch were evaluated for respective surface material for the sanitary articles obtained in experiments 1 to 10 and comparisons 1 to 4. The results are shown in Table 1 and 2.

5 The moisture inhalation was evaluated by measuring weight change of a sample which had reached to equilibrium at 23°C, 30% RH before being exposed in an atmosphere of 30°C, 80% RH for four hours with one side (powder-processed surface) upward.

10 The touch was evaluated by a sensory test by ten persons. The touch of the surface material of comparison 4 was set as standard (3 points), and the points were marked as: 5; superior touch, 4; good touch, 3; ordinary touch, 2; inferior touch, and 1; bad touch.

15 Incidentally, the figures of Table 1 and 2 show the average of the ten persons.

Table 1

	Moisture Inhalation (g/m ²)	Touch
Experiment 1	1.5	4.8
Experiment 2	1.3	4.6
Experiment 3	1.4	4.8
Experiment 4	1.4	4.5
Experiment 5	1.3	4.5
Experiment 6	1.1	4.7
Experiment 7	1.3	4.6
Experiment 8	1.2	4.6
Experiment 9	1.1	4.8
Experiment 10	0.9	4.9

Table 2

	Moisture Inhalation (g/m ²)	Touch
Comparison 1	1.2	2.8
Comparison 2	0.2	3.0
Comparison 4	0.1	3.0

From Tables 1 and 2, it can be observed that the surface materials for the sanitary articles of
5 embodiments 1 to 10 were superior to the surface material of comparison 4 and good and dry touch characteristic of natural material could be obtained, since the natural organic impalpable powder was adhered thereon.

On the other hand, since the average particle size
10 of the natural organic impalpable powder of the surface material for the sanitary article according to comparison 1 was 35 μm , which is more than 30 μm , the touch was inferior on account of rough feeling.

Since the content ratio of the natural organic
15 impalpable powder in the treatment was less than 0.5 wt.% and less natural organic impalpable powder was adhered to the base, moisture inhalation and touch of the surface material for the sanitary article according to comparison 2 could not be sufficiently improved.

20 Since the content ratio of the natural organic impalpable powder in the treatment for the surface material for the sanitary article of comparison 3 was more than 50 wt.%, the viscosity of the treatment was increased in manufacturing, so that the treatment gets
25 non-uniform, i.e. generates a powder mass and a treatment usable for the processing of the base material could not be obtained.

Since the surface material for the sanitary articles according to comparison 4 was unprocessed, it can be observed that the moisture inhalation and the touch were deteriorated.

5 Experiment 11

In the second embodiment, synthetic resin aqueous solution including polyvinyl alcohol, POVAL PVA-117 (trade name) manufactured by KURARAY Co. Ltd., dissolved in water was used as the dispersion medium and sponge powder having an average particle size of 5 μm was used as the natural organic impalpable powder. The sponge powder was mixed in the synthetic resin aqueous solution to be sufficiently dispersed, thereby obtaining the treatment of the present experiment.

15 The content ratio of the respective components in the treatment was 10 wt.% of the sponge powder, 85 wt.% of water and 5 wt.% of polyvinyl alcohol.

Cotton non-woven fabric was used as the base of the surface material. The treatment was coated on the cotton non-woven fabric by a spray processing machine so that the treatment was coated by 30 g/m^2 in Mezuke (Japanese weight unit showing weight per unit area). Subsequently, the cotton non-woven fabric was dried by a hot air drier at 150°C for one minute to obtain the surface material for cotton puff of the present experiment.

25 Comparison 5

The cotton non-woven fabric of experiment 11 was used unprocessed without conducting processing by the treatment of experiment 11.

30 Moisture inhalation, touch and water absorption were evaluated for the respective surface material for the cotton puff obtained in the aforesaid experiment 11 and comparison 5. The results are shown in Table 3.

The moisture inhalation and the touch were evaluated in the same manner as the aforesaid experiments 1 to 10 and comparisons 1 to 4.

The water absorption was evaluated by dropping
5 distilled water onto the surface of the surface material for cotton using a micropipet and measuring the amount of the dropped distilled water before the water leaked out of the back side of the surface material to measure the amount of absorbed water.

10

Table 3

	Moisture Inhalation (g/m ²)	Touch	Absorbed water (μl)
Experiment 11	6.8	4.8	540
Comparison 5	8.2	4.2	124

According to Table 3, it can be observed that good
moisture inhalation and good and dry touch
15 characteristics of a natural material as well as superior water absorption can be obtained by the surface material for cotton puff of experiment 11, since the sponge powder as natural organic impalpable powder was adhered thereon.

Since the cotton puff is often used with liquid
20 cosmetics and great water absorption is required, a surface material suitable for the cotton puff can be obtained by adhering the sponge powder.

On the other hand, though the surface material for a cotton puff according to comparison 5 was superior in
25 moisture inhalation and touch on account of being made of a natural material of a cotton non-woven fabric, the water absorption required as the surface material of the cotton puff could not be satisfied since it was unprocessed.

Industrial Availability

As described above, the skin contact goods according to the present invention is suited for sanitary articles
5 such as disposable diapers and sanitary napkins and make-up tools such as make-up puffs and make-up brushes.

SKIN CONTACTING ARTICLE

Abstract

5 Natural organic impalpable powder is adhered at
least on a side in direct contact with the skin of a skin
contacting article applied to skin. When the skin
contacting article is, for instance, a sanitary article
having a surface material directly applied to the skin
10 and an absorbing body covered with the surface material,
natural organic palpable powder having an average
particle size of less than 30 μm is adhered by processing
the base of the surface member with a treatment. The
treatment includes the natural organic impalpable powder
15 and at least one dispersion medium selected from the
group consisting of water, an organic solvent, a resin
emulsion and a resin aqueous solution. By the above
arrangement, moisture inhalation and touch of the surface
material in direct contact with the skin can be improved.